OHEC/372 1909713/0190E12-E

GEOGRAPHY

Intermediate and
Senior Divisions, 1988

Curriculum Guideline

Part E: The Senior Division Program, New Courses

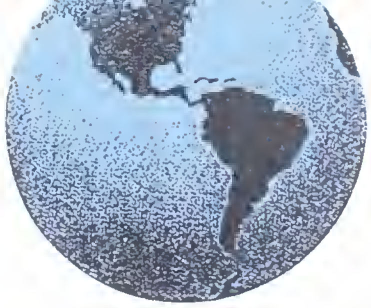
Ministry
of
Education
Ontario

Chris Ward, Minister
Bernard J. Shapiro, Deputy Minister

Digitized by the Internet Archive
in 2019 with funding from
University of Toronto

https://archive.org/details/geographyinterme00onta_2

CONTENTS



INTRODUCTION 2

MAJOR PLANNING CONSIDERATIONS FOR SENIOR DIVISION COURSES
Levels of Difficulty 3
Sequence 3
Teaching-Learning Strategies 4
Student Readiness 4
Attitudinal, Knowledge, and Skills Objectives 5
Assessment and Evaluation of Student Achievement 5
Fractional Credits 6
Co-operative Education 6
School- and Community-Related Packages 6

WORLD DEVELOPMENT: STUDIES IN CONTRASTS (GWD)
Introduction 7
Course Objectives 7
Course Organization 8
Policy and Planning Considerations 9
Course Outline 9

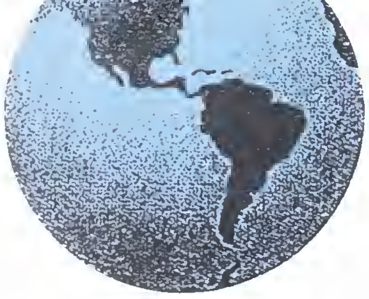
ENVIRONMENTAL STUDIES (GNS)
Introduction 18
Course Objectives 18
Course Organization 20
Policy and Planning Considerations 21
Course Outline 21

GEOGRAPHICS (GOS)
Introduction 33
Course Objectives 34
Course Organization 35
Policy and Planning Considerations 36
Course Outline 36

GEOLOGY (GGE OR SGE) 48

COVER PHOTOGRAPH DOBEL, BLOHM, PATTERSON, GRANT, VILLOTA-MASTERFILE

INTRODUCTION



The study of geography as a discrete subject begins in Grade 7. The Intermediate Division program is designed to give students opportunities to become knowledgeable about the physical characteristics and human use of a large portion of the earth's surface. It includes mandatory courses in Grades 7 and 8 that are based on patterns in geography and a one-credit mandatory course in Grade 9 or 10 based on the geography of Canada. Some students may take an additional course in Grade 9 or 10 based on Europe and Asia. During those studies students will gain some facility with the skills and techniques used in geographic studies. In the Senior Division they will review, practise, and enhance those skills and techniques and develop new ones.

Students who choose to study geography in the Senior Division bring knowledge, skills, and attitudes that they have acquired from geography and other disciplines. Their intellectual and emotional maturity, together with a greater breadth of experience, allows them to refine and enlarge on their conceptual framework and to apply increasingly sophisticated techniques to the investigation and explanation of the world around them. Senior Division courses should build on this foundation, providing students with a broad range of content to investigate and encouraging them to undertake a variety of new learning experiences.

Geographic studies should be characterized by a systematic treatment of topics and an attempt to understand interrelationships between physical and human phenomena.

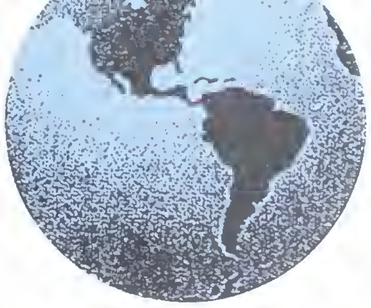
This document contains outlines for the following courses:

- World Development: Studies in Contrasts (GWD)
- Environmental Studies (GNS)
- Geographics (GOS)

Outlines for courses in Geology may be found in *Part 11: Geology, Grade 12, General and Advanced Levels* of *Science, Intermediate and Senior Divisions, 1988*. Geology courses that have a geographic perspective will use the course code GGE.

Along with Physical Geography (GPH), Human Geography (GHU), Regional Geography (GRE), and Urban Studies (GUR), which are described in Part D of the geography guideline, these courses make up the Senior Division non-OAC courses in geography. Since most schools will not be able to offer the full range of courses, each school should develop the combination of courses that, over time, will best meet the needs of its student population.

MAJOR PLANNING CONSIDERATIONS FOR SENIOR DIVISION COURSES



It is essential that reference be made to Parts A and B of this guideline in the planning or implementing of Senior Division courses.

Levels of Difficulty

Geography may be offered in Grades 11 and 12 at one or more levels of difficulty: the basic level, the general level, and the advanced level. All of the Senior Division courses, except Geology and World Development, may be developed for the three levels of difficulty. Geology may be offered only at the general and advanced levels of difficulty, and World Development only at the basic and general levels of difficulty. Some schools may choose to offer bilevel classes.

All courses in the Senior Division have been designed to accommodate the interests, abilities, and goals of Grade 11 and 12 students. While the content base for the various levels of difficulty is similar, teachers must make appropriate adjustments to the course objectives, teaching-learning strategies, and assessment practices to accommodate the educational objectives of the students in their classes.

Sequence

The sequence indicated in the course organization for each course is to be taken only as a suggestion. Teachers may wish to reorder the sections, units, or objectives listed for each unit. Some teachers may wish to teach objectives that are listed under one unit by integrating them into the study of another unit.

Teaching-Learning Strategies

Parts A and B of this guideline assist teachers with teaching-learning strategies. Particular attention should be given to the section entitled "The Learning Process and Geographic Education" in Part A. The development of effective teaching-learning strategies should begin with an understanding of students in general and of their learning styles in particular. Every student has his or her own learning style and unique set of experiences. Successful teachers are sensitive to their students' needs, capabilities, and interests and provide a range of teaching-learning strategies to satisfy them.

The cognitive-inquiry-skills and the geographic-skills charts in Appendixes 2 and 3 of Part B include many suggestions for the development of teaching-learning strategies.

Field work is an integral part of geography, and whenever possible students should plan and carry out field studies to obtain primary data. These studies may be carried out in a variety of ways. The entire class, small groups, or individuals may be involved in observing and recording information on the local environment and then reporting their findings to the class. Even when a course includes the study of industries, physical features, or urban conditions in distant locations, it is often possible to visit an accessible site in or near the local community that provides examples of concepts and principles under study. This assists students in understanding better the conditions prevailing in other places.

At least 20 per cent of the available class time is to be used for independent and small-group studies.

Student Readiness

Almost all of the students taking Senior Division courses will also have taken the Geography of Canada compulsory course and the two senior elementary courses described in Part C of this guideline. Teachers should refer to those courses and build on the attitudes, knowledge, and skills already acquired by students.

Attitudinal, Knowledge, and Skills Objectives

All courses shall include opportunities for students to develop those attitudinal objectives listed for the units studied.

The knowledge and skills objectives for the three levels of difficulty for each unit outlined in this document are indicated under the headings B (for basic-level courses), G (for general-level courses), and A (for advanced-level courses). When the same objective is listed for all three levels of difficulty, it is expected that teachers will determine the appropriate emphasis, degree of sophistication, teaching-learning strategies, and assessment techniques for that objective for their students. Depending on the abilities and needs of their students, teachers may add other knowledge or skills objectives to those listed for any particular unit of a course.

The knowledge objectives outlined in each section shall be included in courses developed from this guideline, but all of them need not be studied to the same degree. Teachers are at liberty to integrate specific knowledge objectives into sections other than the ones for which they are listed.

The skills for each section have been drawn largely from those listed in the charts in Appendixes 2 and 3 of Part B of this guideline. They shall be included in courses developed from the guideline, but all of them need not be developed to the same degree.

Although most of the geographic and cognitive skills may have been introduced and developed in earlier grades, it may be necessary to review and to extend them throughout these courses. Teachers may wish to introduce or reinforce certain skills by integrating them into sections other than the ones for which they are listed.

Assessment and Evaluation of Student Achievement

Teachers should refer to the suggestions on pages 27–28 of Part A and pages 15–16 of Part B of this guideline in planning the assessment and evaluation procedures for these courses. These pages provide useful information on formative and summative evaluation and the major principles on which sound evaluation practices should be based, as well as a variety of questions and techniques that are useful in assessment.

Because a variety of assessment instruments should be employed in the courses developed from this document, considerable time and care must be taken to ensure that the appropriate weight is applied to each of them in the summative evaluation of students' achievement. As in other courses, the weighting of marks should reflect the time spent on achieving the objectives. The forms of assessment chosen should be consistent with the ways in which the objectives were taught and appropriate for the level of difficulty at which the course is being offered.

It is recommended that a formal examination or examinations be included in the evaluation of student achievement. However, no more than 35 per cent of a student's final mark should be based on this means of evaluation.

Fractional Credits

Modules for fractional credit may be developed for all courses in the Senior Division except Ontario Academic Courses. The permissible content of fractional credits is unique to each course and is outlined in the section entitled "Planning and Policy Considerations" for each course.

Co-operative Education

The purposes and conditions of co-operative education are described in Part A of this guideline. The specific requirements for this mode of delivery are described in subsection 5.11 of OSIS. Teachers should consider the potential for co-operative education credits in all Senior Division course offerings except OACs.

School- and Community-Related Packages

Modules developed from the course outlines in this part of the guideline may be particularly appropriate for inclusion in school- and community-related packages. Principals and teachers should consider including courses or modules from Part E when planning takes place.

WORLD DEVELOPMENT: STUDIES IN CONTRASTS (GWD)

Introduction

This course may be offered only at the basic and general levels of difficulty. Courses or modules may be developed from this outline for a maximum of one credit. This course has no prerequisites. The common course code is GWD.

The earth abounds in contrasts: rugged mountains and level plains, dense forests and parched deserts, endless summer and perpetual winter. But no contrasts are more significant to human progress than the contrasts in wealth and development among the world's nations.

The major purpose of this course is to examine contrasts in world development. According to the United Nations:

> The objective of development education is to enable people to participate in the development of their community, their nation, and the world as a whole. Such participation implies a critical awareness of local, national, and international situations based on an understanding of the social, economic, and political processes.

Geographic studies provide methods of organizing large amounts of physical and cultural information into patterns that help to explain situations and circumstances. Much of the explanation for current patterns of world development lies in both historical and contemporary relationships between developed and developing nations. In this course students examine selected countries and groupings of countries that illustrate the vast contrasts in wealth, power, and influence. Attention should be paid at all times to the interactions between North and South countries and to the degree of interdependence that exists among all parts of the world.

A course in world development should help students to arrive at an enhanced understanding of other peoples, places, and circumstances. Often students' existing perceptions are ethnocentric, stereotyped, or based on biased information. Throughout the course, efforts should be made to dispel myths about biological, cultural, and social differences and to foster due respect for other individuals, cultures, and societies. In particular, students should come to understand that they should not define development only in economic terms. Rather, they should evaluate the significance of social, cultural, environmental, moral, and spiritual factors in defining quality of life.

Course Objectives

A course in world development shall provide students with opportunities to:

- identify criteria by which to assess the levels of development of the world's nations;
- describe and explain differences in levels of development among nations and within nations;
- increase their knowledge of a selection of nations in the developed and developing worlds;
- assess the effects of historical, political, economic, environmental, and cultural factors on the use of land and resources;
- appreciate the degree of interdependence among nations in the contemporary world;
- investigate the nature and outcomes of interactions between developed and developing nations;
- become aware of proposals for global reform;
- develop confidence in applying the geographic and cognitive skills outlined in Part B of this guideline;
- become aware of their personal attitudes, biases, and assumptions about other peoples and cultures;
- become aware of the effects of human attitudes and values on the use of space and resources;
- understand a range of opinions about world development.

Course Organization

Section	Description	Per Cent of Course
A. Disparity	This section considers criteria by which nations may be compared.	5–15
B. Developed Nations: Market Economies	The United States is studied as an example of a nation that combines wealth with advanced levels of technology.	20–30
C. Developed Nations: Centrally Planned Economies	The USSR is studied as an example of a Communist nation with a one-party system and state ownership of most aspects of the economy.	20–30
D. Developing Nations	This section examines the characteristics of nations that do not have fully developed economies. A minimum of two examples are to be investigated: – One nation should be chosen from those considered to be least developed. – One nation should have great potential for development and should be moving towards economic independence.	20–30
E. Interaction Among Nations	This section considers the interactions, both positive and negative, that take place between developed and developing nations.	10–20

Policy and Planning Considerations

When planning or implementing this course, teachers must refer to the following:

- Parts A and B of this guideline
- the introduction to the Senior Division geography program on page 2 of this document
- the major planning considerations on pages 3–6 of this document

In addition to the general information provided in the references above, the following items are specific to this course and should be noted:

- ***Levels of difficulty.*** Courses may be developed from this outline for use at the basic and general levels of difficulty.
- ***Fractional credits.*** Modules for fractional credit may be developed from this course outline as follows: a quarter-credit module may be developed by combining an abbreviated section A with studies of two countries chosen from sections B, C, or D (each study must be from a different section); in modules for one-half credit, the course time must be allocated among all sections of the course in approximately equal proportions.

Course Outline

Section A: Disparity

The contemporary world provides examples of nations whose populations enjoy all the advantages that the natural environment and human inventiveness have been able to provide. These include good food, stylish clothing, comfortable shelter, abundant material goods, many educational and career opportunities, full health care, freedom of expression, responsible government, and many other benefits that enable the majority of the citizens of these countries to achieve their potential as human beings. Conversely, there are nations in which individuals have little hope of meeting even basic needs. Such disparity requires explanation.

In this section of the course, students should examine criteria by which human progress can be compared as objectively as possible. Teachers should consider an approach such as the following, in which students:

- gather information from statistical sources (e.g., atlases, yearbooks, textbooks, references from world organizations) on a range of indicators about the economy and living standards of at least twenty nations. They should include indicators such as per capita income, energy consumption, population, life expectancy, nutrition, literacy, and infant mortality;
- for each indicator, group the nations in several categories along a continuum from "strong" to "weak";
- locate and label the nations on a world map;
- investigate the meaning of terms such as the following: First World, Second World, Third World, least developed, developing, and developed nations;
- identify nations that appear to fit the terms;
- try to find a pattern of location for developed and developing nations;
- reach tentative conclusions about the usefulness of the various criteria and terms used to describe levels of development;
- test their conclusions unit by unit as the year progresses.

In order for the data to be meaningful to students, Canada and the United States should be included in the list of nations on which data are gathered.

From 5 to 15 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to:

- assess their personal assumptions and perceptions about what constitutes "normal" human existence;
- evaluate the effects of poverty and affluence on the lives of individuals and nations.

Knowledge objectives. Students shall be provided with opportunities to:

B G	become aware of the disparity in wealth and access to opportunity among nations of the world;
B	learn the criteria used to compare quality of lifestyle within Canada, such as the following: income, education, disposable income, infant-mortality rates, access to services;
B G	learn the criteria used to compare levels of development among nations, such as the following: per capita income, life expectancy, levels of literacy, population growth rate, infant mortality rate, per capita Gross National Product (GNP);
G	learn the criteria used to compare the economies of nations, such as the following: resource base, per capita consumption of energy, proportion of labour force employed in primary industries;
B G	identify examples of nations that, when compared to Canada, show similar and different development indicators;
B G	rank Canada in socio-economic terms among a selection of nations;
B	clarify terms used to describe levels of development, such as the following: developed and developing, rich and poor;
G	identify terms used to describe levels of development among countries of the world, such as the following: North and South; First, Second, and Third World;
B G	evaluate the accuracy and usefulness of the terms;
B G	describe the basic patterns of the world's socio-economic development.

Skills objectives. Students shall be provided with opportunities to:

G	select from a list the best questions to use for a comparison of the development of nations;
B G	brainstorm to identify criteria other than economic criteria that could be used to evaluate quality of life and levels of development;
G	use a ranking system based on social and economic criteria to compare a variety of nations;
B G	find relevant information, using sources such as maps, graphs, photographs, current newspapers and magazines, reports, government departments, and United Nations agencies;
G	find relevant information, using sources such as back issues of newspapers and magazines, specialized maps, and computer software and data bases (with some teacher direction);
B G	record information according to a ranking organizer;
G	record information according to a comparison organizer;
B G	use simple statistical measures such as per capita figures;

B	describe the global location of places through descriptors such as the following: hemispheric and continental location, neighbours, major water boundaries;
G	describe the global location of the countries referred to, using latitudinal comparisons with other countries;
G	construct graphs to illustrate patterns in a set of data;
B	make accurate statements about indicators of development;
G	make accurate generalizations about differences in levels of development among nations.

Section B: Developed Countries: Market Economies

Many nations have achieved and maintained a high level of economic, cultural, and social development. Broadly speaking, such nations are active in world trade and commerce, in the development and use of technology, in the determination of commodity prices, and in the use of the mass media. While unemployment and poverty exist, the majority of the population in such countries has access to good incomes and comfortable lifestyles. The United States is a good example. In this section of the course students should examine how the United States has organized its people and resources to achieve its high living standards.

In order to understand the market economy of the United States, students could examine the following:

- location, extent, and physical attributes (including Alaska and Hawaii)
- the natural resource base of the economy
- organization for the production and distribution of consumer and capital goods
- social, political, and cultural factors affecting development
- ways in which the level of development is reflected in the landscape
- significant current environmental or economic issues, such as the high levels of consumption or the incidence of acid deposition
- the nature and purposes of political, economic, and military alliances with other nations
- the nature and extent of American military involvement around the world

A variety of approaches to the organization of studies may be used. Because the United States is so varied in its landscape, it may be useful to choose a few distinctive areas and study them, using regional-study techniques. (See Part D of the guideline.) Another approach would be to examine aspects of the economy, such as food production, industrial development, tertiary industries, and the use of technology to accomplish tasks efficiently. A third approach would be to focus on two or more major cities and their interactions with the regions surrounding them.

As a result of the studies, students should have an overview of the United States and an understanding of its economic significance in the contemporary world. Teachers may wish to begin or end this unit with a study of significant similarities and differences between the United States and the USSR.

From 20 to 30 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to become aware of their personal attitudes towards the use of resources and the consumption of goods.

Knowledge objectives. Students shall be provided with opportunities to:

B G	explain the indicators used to measure economic development;
B G	describe the characteristics of a market economy;
B G	identify and locate examples of developed countries with market economies;
B G	describe the size and global location of the United States;
B G	describe some outstanding characteristics of the physical geography of the United States;
G	relate physical factors and agriculture in the United States;
G	describe regional differences in the United States;
B G	examine characteristics of the American market economy;
B G	assess the strengths and weaknesses of the American resource base;
B G	account for the current location of selected American industries;
B	identify examples of American influences on Canadian life;
B G	evaluate the world influence of the United States, using economic, political, and military criteria;
B G	describe and evaluate the role of the United States in several international organizations.

Skills objectives. Students shall be provided with opportunities to:

B G	use maps to derive information on the resource base, transportation system, location, population distribution, and income distribution of the United States;
B G	gather information about the United States and its major trading partners, such as products traded and balance of trade;
B	examine print, photographs, and audio-visual material to obtain information on the lifestyles in different areas of the United States;
G	evaluate information sources for bias;
G	explain information about technology, processes, markets, and problems for a farming operation in the United States;
B G	write explanations of information found in graphs and charts;
G	create a series of graphs to illustrate the status of the United States in the world production of commodities such as automobiles, petroleum products, agricultural products, and natural resources;
B	draw diagrams or cartograms to illustrate the movement of selected commodities between the United States and selected trading partners.

Section C: Developed Countries: Centrally Planned Economies

The USSR is by a wide margin the world's largest nation and a world leader in the production of petroleum, coal, grains, minerals, cement, steel, and many manufactured goods. As the major rival of the United States for world power and influence, it is a good example of a political, economic, and social organization that is different from the one with which Ontario students are familiar. This section of the course should enable students to investigate the Soviet approach to the development of human and natural resources through a centrally planned economy.

In order to understand the economy of the USSR, students could examine the following characteristics of that nation:

- location, extent, and physical attributes
- the ethnic and cultural diversity among the peoples who make up the USSR
- the natural resource base of the economy
- organization for the production and distribution of consumer and capital goods
- social, political, and cultural factors affecting development
- ways in which the level of development is reflected in the landscape
- significant current environmental or economic issues, such as urban pollution or economic restructuring
- the nature and purposes of political, economic, and military alliances with other nations
- the nature and extent of Soviet military involvement around the world

Current information about the USSR is more difficult to secure than information about many other nations. Teachers are advised to build up a collection of photographs, articles, videotapes, sample studies, and other sources of current information.

From 20 to 30 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to:

- compare the assumptions about human motivation on which market economies and centrally planned economies are based;
- become aware of the status of men and women in the Soviet economy.

Knowledge objectives. Students shall be provided with opportunities to:

B G	identify and locate several countries with centrally planned economies;
B G	describe the characteristics of a planned economy;
B G	describe the location and extent of the Soviet land mass;
B G	describe the USSR's location relative to the United States and Canada;
G	describe the outstanding characteristics of the physical geography of the USSR;
G	account for the population distribution of the USSR;
G	compare two regions of the USSR, using cultural criteria;
B G	assess the strengths and weaknesses of the Soviet resource base;
B G	explain differences in economic planning between the United States and the USSR;

B	describe examples of current environmental and economic issues in the USSR;
B G	account for the rivalry between the United States and the USSR;
B G	identify examples of co-operation between the USSR and the United States;
B G	identify examples of interaction among the USSR, its satellites, and other countries for economic, scientific, or military purposes;
B	list similarities and differences between personal lifestyles in the United States and those in the USSR.

Skills objectives. Students shall be provided with opportunities to:

B G	compare significant social, economic, or military data on the United States and the USSR;
B G	use library facilities such as catalogues, periodical indexes, and vertical files;
G	derive information from publications such as *Facts on File*;
G	evaluate various sources of information on the USSR for accuracy and bias;
B G	determine distance and direction between major cities in the USSR and in North America, using a globe and string;
B G	use media sources to investigate the lifestyles of Soviet citizens;
B G	reach conclusions based on observations and available data;
B G	use sufficient supporting information to put forth a valid opinion;
B G	defend their own conclusions;
G	explain relationships found in distribution patterns, comparison studies, and examinations of cause and effect;
B G	use charts, graphs, maps, and pictures in their records and notes and in short reports;
G	use simulations and role playing to clarify the way in which points of view affect decision making.

Section D: Developing Nations

In contrast to affluent and developed nations such as the United States and the USSR, many nations face formidable problems in trying to raise the levels of living of their populace to acceptable standards. In this section of the course students should investigate barriers to development in Third World nations.

The Third World is a handy, catch-all label for developing nations that may be immensely different from one another. Some of them, such as the oil states of the United Arab Emirates and Kuwait, are enormously wealthy, with per capita gross national products far in excess of those of Canada and the countries of Western Europe. Other countries, such as Nigeria, Brazil, and Mexico, have raw materials and considerable industrial development. In still other nations, poverty is rampant, development is stagnant, and hope for improvement seems dim.

Students should undertake the study of *two* nations. One choice should be large in both area and population, have a strong resource base, and be much closer to full economic development than most nations of the developing world. Examples include China, Mexico, Brazil, or Argentina. The other choice should come from one of the world's least developed nations, such as Niger, Bolivia, Mali, or Thailand.

The studies should focus on a description of existing conditions in the nations selected and the identification of barriers to human progress. Topic headings such as the following could serve as useful guides for the organization of studies:

- Ethnic and cultural diversity of the population
- Population structure and change in recent years
- Advantages and disadvantages of the physical geography of the nation
- Health and nutrition levels
- Ways in which fundamental human needs are met
- Ownership of land and resources
- Organization of the production and distribution of goods
- Foreign influences on the economy and culture
- Historic, economic, social, political, technical, and cultural factors affecting development
- The effects of technological change on development
- Currently significant social, environmental, or political issues
- The nature and purposes of agreements and alliances with other nations

Combinations of circumstances often work to prevent less developed nations from breaking out of the poverty cycle.

The potential sources (foreign or domestic) of assistance for these nations should be examined.

From 20 to 30 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to:

- examine attitudes and conceptions about other places as being quaint, curious, disaster-prone, or convenient sources of inexpensive raw materials;
- examine attitudes and perceptions about the superiority of one culture over others.

Knowledge objectives. Students shall be provided with opportunities to:

B	G	examine contrasts in living standards within and between at least two developing nations;
B	G	investigate the existing physical, social, economic, and political conditions in the nations under study;
B		assess some of the factors affecting development within the developing countries, such as tradition, population patterns, socio-economic divisions, resources, availability of capital, and levels of technology;
	G	investigate internal and external factors affecting progress in developing nations;
	G	study examples of the conflict between developed and developing nations over resource development;
B	G	understand the role of the military and armaments in developing countries;
B	G	learn of potential sources of assistance, either foreign or domestic, that could improve the welfare of the countries studied;
B	G	evaluate a development initiative within one of the developing countries under study.

Skills objectives. Students shall be provided with opportunities to:

B	G	develop an organizer to compare the levels of development of two nations;
B	G	locate information from a variety of sources, such as atlases, charts, newspapers, films, government agencies, tourist agencies, yearbooks, magazines, and primary sources;
B	G	select relevant information from books, magazines, and other resources;
B	G	use an atlas gazeteer efficiently and effectively;
	G	use information-access tools such as library catalogues, computer software, and data bases (where available);
	G	use criteria to evaluate the reliability of information sources;
	G	identify different perspectives in information;
B	G	examine photographs to determine similarities and differences among places;
	G	classify causes and effects of underdevelopment as environmental, economic, social, cultural, political, or a combination of these;
B		speak in a variety of situations, for example, asking and answering questions, participating in small-group discussions, and role-playing;
	G	speak in a variety of situations, for example, role-playing and presenting oral reports;
B		present information visually in the form of maps, graphs, photographs, and charts;
	G	list and explain factors that must be considered in the development of a major project in a developing nation;
	G	discuss the advantages and disadvantages of a specific large development project in a developing country;
B	G	identify factors that contribute to poverty and underdevelopment, rank the factors in order of importance, and suggest ways in which their effects can be reduced or overcome.

Section E: Interaction Among Nations

Even a minor reduction in the consumption of chocolate in North America can seriously affect the economy of the Ivory Coast. Similarly, the opening of an auto-assembly plant in Brazil can affect employment in the United Kingdom or Canada. When Japanese corporations enter into agreements with North American manufacturers to build auto-assembly plants in Ontario, employment in European, North American, South American, and Asian nations can be affected. These are only three of the thousands of changes in economic realities that occur every year and have widespread effects throughout the world.

The conception of the world as a "global village" exists because all parts of the earth continue to be drawn together into an interdependent world system. The evidence is all around us and is cited daily in every newspaper. Thus, it is important that students have both accurate perceptions of developed and developing nations and an understanding of the outcomes of the interactions between them.

Studies in this section should reveal to students both the positive and negative effects of the interactions between developed and developing nations, such as the following:

– the dilemmas faced by developing nations in choosing among paths of development

– the enormous power and influence of developed nations such as the United States and the USSR in world affairs

– the efforts that are being made by governments and non-governmental organizations to redress the disparity between rich and poor nations

– proposals for reform and developments that are affecting the current global economic structure

– alternative futures of world development (based on the studies completed during the course)

From 20 to 30 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to:

– question whether northern institutions and technology are appropriate in dealing with the issues and problems in the developing nations;

– participate in activities that recognize and respond to a development need in their own community or a less developed nation.

Knowledge objectives. Students shall be provided with opportunities to:

B G	examine the degree of interdependence among nations in areas such as the following: trade, foreign investment, defence, tourism, educational exchanges, political alliances;
B G	investigate the organization of multinational companies and describe their influence in other nations;
B G	examine some of the positive and negative effects of the interaction between developed and developing countries;
B	assess the effects of the historical links between a developed and a developing country;
B G	account for the disproportionate share of the world's wealth, power, and markets that is controlled by developed nations;
B G	describe the nature and purpose of organizations that exist to aid developing countries;
G	study models of development that are appropriate for developing countries;
G	identify changes in attitudes and values that are required among developed and developing countries if the rate of world development is to improve;
B G	examine the potential of new technologies to benefit both the developed and developing worlds.

Skills objectives. Students shall be provided with opportunities to:

B G	use the inquiry model described in Part B of the geography guideline to explore interactions between developed and developing countries;
B G	develop diagrams to illustrate some of the effects of the interaction between developed and developing nations;
B G	use current world development problems and issues as the basis for their inquiry;
G	gather information, using media sources, well-planned interview techniques, or guest experts;
B G	collect and interpret information about development from graphs, charts, tables, and diagrams;
G	evaluate various sources of data for accuracy and bias;
B G	analyse information to determine cause-and-effect relationships;
B	apply a general rule to a specific case;
G	apply a general rule to a variety of cases;
G	write to persuade;
B G	describe, explain, and persuade orally;
B G	assess the usefulness of the skills used in the inquiry.

ENVIRONMENTAL STUDIES (GNS)

Introduction

Courses may be developed from this outline for a maximum of one credit. The course has no prerequisites. The common course code is GNS.

Although people are at the centre of environmental studies, humans are but one component within the complex systems of animate and inanimate forms that make up the earth's biosphere. During recent years, however, there has been widespread concern about the cumulative effects on the environment of population growth and the accelerating demand for resources to meet human needs. The immense capability of people to use and to change the environment also gives them the power to damage it, perhaps irreversibly. Local, national, and international authorities have made clear calls for individual, national, and international action to maintain and enhance environments in all parts of the world.

This course examines human activity as a major environmental process. The course should enable students to understand the intricate relationships that exist within all ecosystems; to see that, when people alter the environment, other changes follow; and to know that some outcomes are immediate and obvious while others are subtle, long-term, difficult to predict, and frequently irreversible. Students should develop a *knowledge* of the environment, a *sensitivity* to the relationships within it, a sense of *responsibility* for their own actions, and a *commitment* to environmental quality and conservation. Students should also become aware that there may be solutions to environmental issues through co-operative and responsible management practices. As students, they need to be concerned as much with the future as with the present and the past.

Environmental studies seldom have neat boundaries. A course in environmental studies should be interdisciplinary and use information from any source that will help to shed light on the topic under study. In their planning, teachers may wish to refer to *Part 8: Environmental Science, Grades 10 and 12, Advanced Level of Science, Intermediate and Senior Divisions, 1988.*

Course Objectives

A course in environmental studies shall provide students with opportunities to:

– develop an awareness of the aesthetic value of nature and an appreciation for the significance of all of its components;

– evaluate their attitudes, values, and responsibilities with respect to the use of their environment;

– gain an understanding of the ecosystem concept, how the components of an ecosystem interrelate, and how ecosystems occur in identifiable spatial patterns;

– analyse, explain, and evaluate the nature of, and the reasons for, human modifications of natural and built environments;

– identify and explain the nature and significance of environmental issues at local, regional, and international scales;

– appreciate the need for, and value of, co-operative approaches in the solution of environmental issues;

– identify principles of environmental management;

– recognize the capabilities of current technology to gather and process information on environmental processes and trends;

– investigate local environmental issues and suggest solutions to them;

– recognize that environmental studies use principles and concepts from a variety of fields, including geography, geology, geomorphology, urban and rural planning, resource management, biology, ecology, physics, chemistry, psychology, sociology, politics, philosophy, and history;

– practise and improve their skills in field work and other inquiry strategies in order to arrive at thoughtful conclusions;

– become aware of the many and varied career opportunities within the field of environmental studies.

Course Organization

Section	Description	Per Cent of Course
A. Environments	All of the following units are to be studied for a minimum of 25 per cent of the time available for the course.	25–35
1. Ecosystems	This unit presents the concept of ecosystems as consisting of abiotic and biotic (including human) components and describes the ways in which these components are integrated into systems.	
2. Ecosystems and Resources	This unit develops a general understanding of ecosystems as sources of renewable resources. Examples are drawn from water, forest, soil, and human-created systems.	
3. Built Environments	In this unit students will examine some of the environmental consequences of concentrating large numbers of people on relatively small areas of land.	
B. Change and Choice	Both of the following units are to be studied for a minimum of 20 per cent of the time available for the course.	20–30
1. Changing Environments	This unit considers the causes and effects of change in the environment. Students will analyse examples of change to determine whether the causes are physical, human, or a combination of both.	
2. Preservation, Conservation, and Environmental Management	In this unit students will investigate the concepts of preservation, conservation, and management of environments. Questions are raised about the need for and the scale of environmental management.	
C. Environmental Issues	Students will examine one or more issues at each of three scales: local, regional (or continental), and global. A systematic inquiry process is suggested for at least one study.	35–55

Policy and Planning Considerations

When planning or implementing this course, teachers must refer to the following:

– Parts A and B of this guideline

– the introduction to the Senior Division geography program on page 2 of this document

– the major planning considerations outlined on pages 3–6 of this document

In addition to the general information provided in the references above, the following items are specific to this course and should be noted:

– ***Environmental studies and related courses.*** Environmental studies has its own geographical perspective. It places an emphasis on people and their interactions with, and attitudes towards, the environment. Studies should include concepts of location, pattern, spatial interaction, and region as well as their main focus on the interaction of humans and the environment. Teachers should also recognize the possibilities of overlap with other geography courses and avoid undue repetition.

– ***Out-of-classroom settings.*** This course should include strategies that will enable students to study outdoor environments. Up to 25 per cent of the scheduled course time may be allocated to the development of skills and techniques in out-of-classroom settings.

– ***Systems approach.*** The earth's environment may be viewed as one ecosystem or many ecosystems, depending on the rationale for investigating it. In this course students should develop a conception of both the human and natural environments as mosaics of systems within and among which are linkages, interrelationships, and interdependencies.

– ***Content choice.*** Students should be provided with opportunities to develop environmental understandings at scales ranging from the local to the global. Content must be balanced among local, regional (or continental), and international examples. Teachers shall ensure that illustrations and examples are drawn from a minimum of four continents. Students should be involved in identifying some of the topics for study.

– ***Fractional credits.*** Modules for fractional credit may be developed from this course outline as follows: a quarter-credit module may be developed from section A or section B; a half-credit module may be developed from section C.

Course Outline

Section A: Environments

All of the following units are to be studied for a minimum of 25 per cent and a maximum of 35 per cent of the time available for the course.

1. Ecosystems
All living organisms, including humans, require a set of conditions in order to exist. The requirements include a combination of nutrients, air, energy, water, and space. The combination makes up the organism's habitat. A community comprises an association of organisms, each occupying a certain position, inhabiting a common environment, and interacting with each other. All of the communities that share specific habitat requirements are bound together by food chains, energy flows, and other interrelationships.

Combinations of biotic and abiotic components form ecosystems. Where conditions over large areas are sufficiently similar, broad patterns of ecosystems will result, with local variations based on factors such as slope, drainage, and bedrock.

The biosphere encompasses the entire zone of the earth that is favourable to life in one form or another. For the purposes of this course, this constitutes the human habitat. The evidence indicates that before people extended their influence over much of the earth's surface, the biosphere consisted of natural environments that were reasonably stable or little changed over long periods of time. Today a decreasing proportion of the earth's natural environments remain untouched by human activities.

In this unit students consider ecosystems. They should first examine one or more examples at each of the following four scales. They should become aware of current and proposed human activities that act to change the ecosystem at each scale.

– ***microscale:*** the interrelationships within a small ecosystem, such as a rotting log, a fence row, a plot of grass, a cave, or an aquarium

– ***local scale:*** interrelationships within a larger ecosystem, such as a wetland, escarpment, shoreline, or watershed

– ***regional scale:*** the systems and interrelationships within biomes, such as tundra, temperate deciduous forest, or grassland

– ***global scale:*** the major components of the biosphere and their characteristics

Attitudinal objectives. Students shall be provided with opportunities to:

– establish, in a preliminary way, personal goals for their participation and achievement in the course;

– identify a variety of societal attitudes, including the attitudes of indigenous peoples, towards natural environments.

Knowledge objectives. Students shall be provided with opportunities to:

B	G	A	develop working definitions of terms such as the following: system, habitat, community, ecosystem, biome, biosphere, environmental equilibrium;
B			describe the relationships within a food chain in the local environment;
	G	A	associate the local community with the biome of which it is a part and describe ways in which the biome has been modified by human activity;
B	G	A	explain the functions of water and energy within a selected ecosystem;
		A	explain the functions of chemical processes within a selected ecosystem;
B	G	A	describe a number of the relationships within an ecosystem at each of the local, regional, and global scales;
B	G	A	identify and describe one environmental issue at the local and regional scales;
		A	identify and describe one environmental issue at the global scale;
	G	A	discuss the importance of ecological balance in the environment at any scale.

Skills objectives. Students shall be provided with opportunities to:

B	draw diagrams to illustrate the components of a specific habitat and the interrelationships among them;
G A	use diagrams to illustrate the relationships among the components of a habitat, a community, and an ecosystem;
G A	draw diagrams that show interrelationships among the human and natural components of an ecosystem;
G A	generate a list of questions on the relationships among components in an ecosystem;
B G A	map the location of an ecosystem under study;
B G A	list and explain five or more examples of human interventions that affect habitats;
B G A	analyse newspapers and periodicals to identify environmental topics;
B G	use popular newspapers and periodicals as sources of information on current environmental issues;
G A	relate information from newspapers to ecosystem concepts.

2. Ecosystems and Resources

The renewable resources that are essential for human survival and sustained development must come from the earth's ecosystems. Over the centuries the human populations of the earth have developed techniques to harvest natural resources in increasingly efficient ways but, until recently, without sufficient regard for the long-term consequences for the ecosystems that make up the environment. Some of the efforts to make environments more productive have taken the form of major development projects. In this unit students should examine some positive and negative outcomes of the human use of ecosystems. Examples should be drawn from three of the following:

– ***water ecosystems:*** for example, coastal wetlands, inland lakes, ocean "banks", coral ecosystems

– ***forest ecosystems:*** for example, coniferous, deciduous, or tropical forests

– ***soil ecosystems:*** for example, prairie, desert, or tropical soils

– ***created or reclaimed environments:*** for example, polders, reclaimed wetlands, terraced hillsides, dammed rivers, hydroponic farming, aquaculture

Each study should include maps to show the locations of the areas under study and a description of the relationships within the ecosystems being studied.

Attitudinal objectives. Students shall be provided with opportunities to:

– distinguish between people's wants and needs;

– assess the relative importance of economic and aesthetic objectives in the use of distinctive ecosystems;

– reflect on their attitudes towards their personal consumption of renewable resources.

Knowledge objectives. Students shall be provided with opportunities to:

B G A develop working definitions of terms such as the following as these terms apply to the use of the ecosystems under study: adaptation, modification, depletion, renewable, management, sustained yield;

G A explain the combination of biotic and abiotic factors and processes that act to produce a distinctive soil, wetland, or forest;

B G A describe examples of pressure on specific environments generated by the human demand for food, fibres, and wood products;

B G A identify examples of successful efforts to increase the productivity of specific natural environments;

B G A identify examples of unsuccessful or damaging human interventions into specific natural environments;

B G investigate the environmental side effects of one or more environmental development projects;

A investigate the social side effects of one or more environmental development projects;

G A identify and describe one or more ecosystems currently under pressure from demands for renewable resources;

B identify the sources of demand for resources from an ecosystem under study;

G A evaluate the effects of technology on the rate of use of specific renewable resources;

A investigate ways in which the productivity of ecosystems can be enhanced without irreversible damage;

B G A investigate the purpose and nature of environmental-impact studies.

Skills objectives. Students shall be provided with opportunities to:

B G A formulate suitable questions for an inquiry into the demand for renewable resources;

B G A select and develop an organizer to focus an inquiry into the effects of the demand for renewable resources on a selected ecosystem;

B G A use information-access tools such as the library catalogue and periodical indexes to find data about life-support systems;

G A use information-access tools such as indexes to films and videotapes, newspapers, and periodicals;

G A use information-access tools such as data bases;

G A observe relationships in distribution patterns as provided in maps and aerial photos;

G A speculate about the outcomes of current trends in consumption;

B G A communicate in an appropriate way the findings of their inquiry into the demand for renewable resources.

3. Built Environments

As technology enables a decreasing proportion of the earth's population to be involved in the recovery of resources, an increasing proportion of the population is moving into urban places. Urban places, however, can provide only a small proportion of the resources necessary to feed and clothe, as well as build dwellings and workplaces and generate energy for, the population.

Almost all the resources must be imported from natural environments, often at a great distance. Similarly, urban environments cannot absorb or dispose of the by-products and wastes created by urban activities, and these surpluses must be removed.

In this unit students investigate systems by which urban environments are built and maintained and examine the environmental consequences of concentrating large numbers of people on relatively small areas of land. The following three studies will be undertaken:

- a study of an urban environment, focusing on the systems developed to provide urban populations with resources and to remove surpluses
- a study of the effects of urban growth on the land, water, and air in the immediate vicinity of an urban place
- a study of the effects of the urban demand for non-renewable resources on environments that may be at a great distance from the urban place

To ensure that students fully comprehend the spatial extent of urban influences on the environment, the last two studies above should include one or more systems diagrams or sketch maps showing the interaction between urban places and the sources of non-renewable resources.

Attitudinal objectives. Students shall be provided with opportunities to:

- evaluate their attitudes towards the consumption of non-renewable resources;
- become aware of the effects of resource-recovery practices on the environments where non-renewable resources are acquired;
- review their practices with respect to the disposal of litter and wastes;
- evaluate concepts and principles associated with environmental planning in urban places.

Knowledge objectives. Students shall be provided with opportunities to:

B G A	develop working definitions of terms such as the following: built environment, distribution and collection systems, non-renewable resources;
B G	describe the basic differences between natural and built environments;
B G A	learn about systems by which urban demands for water, energy, and raw materials are met;
B G A	describe systems by which surplus water and wastes are removed from urban places;
B G	describe the effects on the environment of the urban demand for non-renewable resources for energy, building, and manufacturing;
G A	identify and describe one or more issues related to the disposal from urban places of toxic and non-toxic wastes, including airborne wastes;
A	identify and describe one or more health issues related to the urban environment;
B G A	identify occupations and careers associated with the development and maintenance of urban systems.

Skills objectives. Students shall be provided with opportunities to:

B G A	generate a list of questions on the effects of population concentration on the demand for non-renewable resources;
G A	design and carry out research, using procedures such as interviewing and gathering;
B G A	select appropriate pictures, maps, diagrams, charts, tables, opinions, and quotations for specific purposes;
B G A	develop and test a questionnaire to sample opinion on an urban environmental issue;
B G A	present and defend an opinion based on valid evidence.

Section B: Change and Choice

Both of the following units are to be studied for a minimum of 20 per cent and a maximum of 30 per cent of the time available for the course.

1. Changing Environments

Given increasing human populations and the dynamic nature of systems in the environment, it is inevitable that environments will continue to change. Changes in environments can occur as a result of natural processes, of social processes, or of a combination of both. In this section of the course students consider some causes of change and the consequences of the change for both people and the environment. Relatively large-scale changes should be chosen for investigation. The causes of change may be natural, such as earthquakes, volcanoes, or hurricanes; they may be human activities, such as damming a river system, logging a forest, or building a nuclear power plant; or they may be a combination of both, such as desertification or the salination of soils.

The investigation should follow a process such as the following:

- describing the characteristics of the environment to be investigated
- describing the natural and social processes that created the environment
- describing the changes occurring (or planned in the case of a development)
- explaining the changes in terms of natural processes (e.g., erosion or sedimentation) and human processes (e.g., migration, redevelopment, or economic demand)
- predicting the likely consequences of changes on the environment
- proposing possible strategies to manage the change and its effects
- choosing and justifying a preferred strategy to deal with the changes

Attitudinal objectives. Students shall be provided with opportunities to:

- become aware of the risks to human life posed by natural disasters;
- assess the level of risk from potential natural or human-caused disasters in their community and their personal state of preparedness.

Knowledge objectives. Students shall be provided with opportunities to:

B	describe examples of population changes that are putting pressure on the environment;
G A	find examples of economic, social, technological, and political developments that lead to pressure on the environment;
B G	identify and describe examples of environmental change at local, regional, and global scales;
B G	list examples of "trigger events" of natural or human origin that launch major changes, for example, cyclones or oil spills;
A	analyse examples of environmental change at local, regional and global scales to determine whether the causes are primarily physical, primarily human, or a combination of both;
G A	evaluate the resiliency of ecosystems within the environments chosen for study;
B G	describe the economic and social effects of specific environmental changes;
A	discuss the relative importance of economic, social, political, recreational, health, and aesthetic criteria in evaluating the effects of specific environmental changes;
B G A	investigate the measures in place locally to deal with an emergency resulting from a natural or human-caused disaster.

Skills objectives. Students shall be provided with opportunities to:

B G A	develop an appropriate organizer for an inquiry into the causes and effects of environmental change;
B	design and carry out research on environmental change, primarily within the community, using procedures such as observing, gathering, counting, sampling, and interviewing;
G A	design and carry out research within the community (and, when possible, farther afield), using procedures such as observing, counting, sampling, and interviewing;
B	use charts, graphs, diagrams, maps, and pictures as part of records and in short reports;
G A	use complex charts, graphs, diagrams, maps, and pictures in their records and notes, short reports, and some assignments.

2. Preservation, Conservation, and Environmental Management

In most of the populated areas of the earth, little remains of the natural environment. In human terms, many natural environments have been made more useful and productive by some form of management. Often their productivity has been enhanced by the enriching of the basic physical and chemical processes of the environment. Examples include the soils of Western Europe and the forests of Sweden. In Ontario, watersheds have been placed under management, not only to restore the water regime that was upset when the original forests were removed, but also to provide habitats for wildlife and accessible places for public recreation. In many cases the knowledge needed for management was accumulated over long periods of time, or management became necessary because of a catastrophic occurrence such as a flood or erosion caused by wind.

It now appears that the environment may have to be managed on a global scale. As environments come under increasing pressure in the worldwide search for resources, many unique ecosystems are threatened, either as a result of exploitation or the destruction of habitat. As a result, many species of plant and animal life may disappear. The loss of habitat to land uses such as agriculture, urban growth, tourist and recreational demands, forestry, and mining is one factor, while the increasing use of chemical and biological technologies is another. In this unit students investigate the concepts of preservation, conservation, and management of environments.

Attitudinal objectives. Students shall be provided with opportunities to:

– evaluate the arguments for and against the retention of wilderness areas;

– evaluate principles on which provincial and national parks are established and maintained;

– propose principles and concepts on which the management of natural environments should be based.

Knowledge objectives. Students shall be provided with opportunities to:

B G A	develop working definitions of terms such as the following: genetic diversity, conservation, habitat preservation, environmental systems, environmental management;
B G A	identify threatened and endangered species and describe the factors that are affecting their continued existence;
B G A	identify and describe examples of unique but threatened natural environments in the world;
B G	describe and explain examples of conservation practices used in agriculture and forestry;
B G	learn the rationale for declaring a site a provincial or national park;
A	learn the rationale for declaring a site a World Heritage area;
B G A	investigate one or more provincial park, national park, or World Heritage areas to determine their nature and purpose;
A	identify and describe the principles of multiple-use management of park areas;
B G	identify and explain the principles of wildlife-habitat management;
B G A	identify occupations and careers associated with the management of natural environments.

Skills objectives. Students shall be provided with opportunities to:

B G A	review newspapers, periodicals, and current literature to identify references to, or examples of, proposals for action to preserve, conserve, or manage areas of land;
B G A	describe the circumstances that have led to the proposal or action identified above;
G A	discuss the environmental principles and values on which the proposal or action is based;
B G	compare two types of provincial or national parks, using criteria such as purpose, use, and management needs;
A	compare two specific conservation programs (e.g., a soil program and a forest program);
B G A	summarize information from comparison charts;
B G A	distinguish between opinion and fact in information;
B G A	identify bias and point of view in information;
B G A	draw conclusions based on the systematic evaluation of evidence;
G A	describe, explain, and defend a point of view on a conservation or preservation proposal;
G A	evaluate, by examining a topographic map, the appropriateness of an area as a site for a national or provincial park and propose and defend a specific type of park for the area evaluated.

Section C: Environmental Issues

In this section of the course students apply the principles and concepts developed in sections A and B to the study of environmental issues. Environmental issues exist at virtually every scale, from the neighbourhood to the biosphere. Furthermore, environmental issues have physical, social, economic, political, aesthetic, and values dimensions. To illustrate the complexity of environmental issues and the significance of scale in the efforts to deal with them in a satisfactory way, students should investigate issues at each of the following three scales: local, regional or continental, global.

Not all issues can be addressed in depth, and it may be appropriate for one or two scales to be considered through the use of a number of examples; one study shall, however, be organized to respond systematically to a series of questions such as the following:

- What is the issue?
- What is its location, extent, and significance?
- What factors or processes (physical, social, economic, political) have led to the current situation?
- Why are there differences of opinion about the appropriate action to take? What are the differences?
- Who is affected? Who takes an interest?
- Who, if anyone, has the responsibility for a resolution?
- What attempts have been made to date to resolve the issue, and what results have been achieved?
- On what principles or concepts should the resolution be based?
- What strategies might be used by the persons or organizations responsible for resolving the issue?
- What actions could be taken by an individual that would help to resolve the issue?
- Are there ways of anticipating future environmental issues and of planning to avoid them? Is it possible to invent the future?

Such an inquiry might be undertaken by an individual, a group, or the entire class.

From 35 to 55 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to:

- recognize the responsibilities that accompany the power to make decisions;
- consider the importance of social and cultural criteria in decision making;
- propose and defend a specific principle or principles as a basis for decision making and action;
- assume and defend a position on a proposed action to change some part of the local environment.

Knowledge objectives. The knowledge that is necessary to understand an issue will be specific to the issue selected for investigation. Teachers should ensure that students apply the principles, concepts, and skills acquired in sections A and B of the course to their studies in section C. As one outcome, students should recognize the need for and usefulness of a systematic approach to the investigation of an issue. As another outcome, students should be aware of the objectives and activities of government and non-government organizations that are involved in environmental issues. Students should spend some time evaluating the inquiry skills they use in issue studies.

Skills objectives. Teachers should refer to Appendixes 2 and 3 in Part B of the guideline for assistance in the organization of the systematic study prescribed in this section of the course.

Students shall be provided with opportunities to:

B G A identify an issue and state it in their own words;

B G A use or develop and use an issue-analysis organizer;

B G A draw conclusions, based on the data gathered;

B G A discuss decisions that could be made on the basis of the data gathered;

B G A propose and defend a resolution to the issue, based on the information available;

B G A communicate the results of the issue analysis in an appropriate form;

G A speculate about ways of anticipating or preventing similar issues in the future;

B G A demonstrate their capability to:

- a) interpret topographic and other large-scale maps;
- b) select map projections to suit specific purposes;
- c) select maps at appropriate scales;
- d) evaluate the advantages and disadvantages of a location, using specific criteria;
- e) relate variables, using profiles and transects;
- f) use maps showing information derived by methods of remote sensing;
- g) interpret vertical and oblique air photographs in a systematic way;
- h) interpret a variety of graphs;
- i) use diagrams and models to show interactions and relationships.

Topics in Environmental Studies

This course requires studies at local, regional, and global scales. The following lists provide teachers with assistance on sources of topics. Whenever possible, current events and issues should be used to initiate studies and to illustrate principles and concepts.

Global Scale

– ***air:*** ozone depletion, long-term climatic change, acid deposition, dispersion of radioactivity, insolation levels, oxygen-CO_2 balance

– ***water:*** chemical spills, depletion of fish stocks, toxic contaminants, tsunamis

– ***land:*** disposal of nuclear wastes, extinction of plant and animal species, desertification, salinization of soils, use of herbicides and pesticides

Continental/Regional Scale

– ***air:*** acid deposition, intense storms, earthquakes

– ***water:*** water diversion, hydrologic cycles, water surplus and deficit, conflicting demands for water

– ***land:*** fossil water depletion, biological controls, poaching of wildlife, land clearance, earthquakes, hazardous zones (e.g., margins of deserts), forest-management practices, toxic and carcinogenic chemical buildup, pest control, wildlife-management practices

Local Scale

– ***air:*** microclimates, smog, asbestos fibres, odours, nitrous oxides

– ***water:*** pollution from all sources, siltation, flooding, diversions, land clearance, channelization

– ***land:*** land contamination, conflicting land uses, ground-water contamination, heavy metals, poaching of wildlife, visual blight, forest fires, large dam building, monoculture, waste disposal, biological pest control

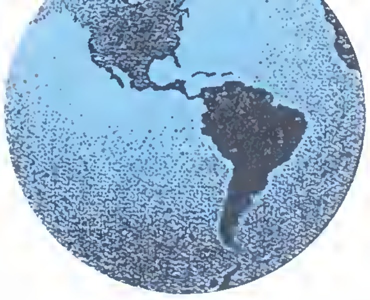
Urban Environmental Issues

– ***air:*** wind tunnelling, auto emissions, lead and asbestos fibre residues, wood-burning stoves and fireplaces

– ***water:*** ground-water contamination, surplus water removal, urban water supply

– ***land:*** dredging, reclamation, solid-waste disposal, chemical fertilizers, waste-oil disposal

GEOGRAPHICS (GOS)



Introduction

A student may earn a maximum of one credit from a course or modules developed from this course outline. The course has no prerequisites. The common course code is GOS.

For the purposes of this course, *geographics* is defined as the use of graphic forms of communication to derive or present spatial information effectively.

In many ways, everyone uses geographic knowledge and skills every day. We organize shopping trips, give people directions, rent or buy houses, and plan vacations. The commuter looks for the best way to get to work, the entrepreneur considers the merits of one community over another, and the town council determines the location of its next waste-disposal site. The school board must plan bus routes and the location of school buildings. On a continental and global scale, there is ample evidence that humankind must make increasingly complex decisions about the use of land and resources. In each of these examples, a knowledge about places, locations, distance, direction, and the relationships of things in space is required if intelligent decisions are to be made. Individuals, industries, and governments require the skills to locate, assemble, analyse, and organize information so that they can make good decisions about the use of space and resources.

This course stresses the development of students' ability to identify issues and questions for which a spatial perspective is useful, acquire and analyse information from relevant sources, present information by means of graphic techniques that make patterns and relationships clear, and propose ways to deal with the issues and questions in effective ways. The course should help students to identify needs, work towards solutions, make decisions, accommodate change, and recognize the many systems that affect their lives. Teachers *must ensure* that the studies undertaken encourage skill development in the context of a problem or situation for which the particular skill is needed.

Traditionally, the most significant tool of the geographer has been the map. As the technology for gathering, processing, and presenting information becomes more sophisticated, geographers are combining other forms of graphic communication into their array of tools and techniques. In all sections of this course the phrase *graphic forms* refers to photographs, film, remotely sensed images, charts, graphs, diagrams, models, and maps, but with a particular emphasis on maps.

Increasingly, electronic technologies are used for data gathering, storage, analysis, and presentation. For this course or for any module developed from this outline, students must have access to electronic technologies to perform such operations as the following in a relatively short time: accessing data bases; creating maps, charts, and graphs; using spreadsheets. Teachers should exploit this advantage by having students spend time investigating the questions raised by the patterns, trends, or relationships that the data reveal.

Because courses based on this outline involve the graphic presentation of information, teachers may wish to test students' spatial-perception capabilities before they undertake the course.

Course Objectives

A course in geographies shall provide students with opportunities to:

– identify a variety of forms involving graphic techniques in which spatial data can be presented;

– develop skills in observing, recording, classifying, organizing, managing, and interpreting spatial information in graphic forms;

– identify and describe contemporary methods of gathering, processing, storing, retrieving, analysing, and presenting information by using graphic techniques;

– develop an appropriate range of research skills;

– develop an appropriate range of cartographic and design skills;

– evaluate the accuracy and reliability of information presented in graphic forms;

– identify questions and issues that can be investigated or resolved through the use of graphic techniques;

– apply graphic techniques in the investigation and resolution of issues and questions related to the use of land and resources;

– relate the scale of a study to the selection and presentation of data;

– work co-operatively to complete projects;

– develop cognitive and geographic skills as described in Part B of this guideline.

Course Organization

Section	Description	Per Cent of Course
A. Spatial Information	This section is designed to help students appreciate the significance of spatial information in the local community.	5–10
B. From Reality to Abstraction	This section is designed to develop students' ability to understand their own environment, first by sensing and recording information about it and then by solving the problems inherent in designing and drafting graphic presentations that will enable others to understand the environment.	10–20
C. From Abstraction to Reality	In this section students develop the skills required to interpret graphic forms used to convey spatial information. The three key operations are reading, analysing, and interpreting graphic forms, including a topographic map.	10–20
D. Locations and Distributions	In this section students examine sources of spatial information and systems used to gather, store, and analyse information. Students assess the factors that give value to the location, distribution, and interaction of human and natural phenomena.	25–40
E. Applications of Geographic Techniques	In this section students investigate issues or situations that may be understood through the use of a geographic perspective. Students will investigate a minimum of two issues of local, regional, national, or international significance.	25–40

Policy and Planning Considerations

When planning or implementing this course, teachers must refer to the following:

– Part A and B of this guideline, in particular, Appendixes 2 and 3 of Part B

– the introduction to the Senior Division geography program on page 2 of this document

– the major planning considerations outlined on pages 3–6 of this document

In addition to the general information provided in the references above, the following items are specific to this course and should be noted:

– ***Integration of sections.*** This course focuses on problem solving, the handling of information, and the development of graphic communications skills. Although the outline is organized into five sections, teachers may integrate the objectives of sections A, B, and C into the projects organized to meet the objectives of sections D and E.

– ***Projects and assignments.*** Students will be involved in a number of projects and assignments on an individual and a group basis. Class time should be allocated for this purpose, and the skills students will require to work independently and as members of a group should be taught as necessary.

– ***Time allocation.*** The course should enable students to investigate a range of topics and become familiar with a variety of information systems and graphic forms. For these reasons, no single topic or assignment should occupy a disproportionate amount of the time allocated either to a unit or to the course.

– ***Evaluation of graphic materials.*** Because students will devote a significant percentage of scheduled course time to the design and preparation of graphic materials, an equivalent percentage of the total mark allocated for the course should be awarded for this. Students will compile a portfolio of work over the duration of the course. The portfolio should contain two general categories of work: some should be high-quality presentations; others could be less polished, that is, they could illustrate the operations involved without meeting the standards normally expected of final copy. The assessment of student progress should be ongoing so that students are well aware of course objectives and their progress in meeting those objectives.

The level of difficulty at which a course is offered will affect students' choice of projects.

– ***Fractional credits.*** Modules for fractional credit may be developed from this course outline as follows: a quarter-credit, one-third-credit, or half-credit module may be developed from the objectives of sections D or E; a half-credit module may be developed by combining the objectives of sections A, B, and C. Fractional credits greater than one-half should include objectives from sections B, C, D, and E; the time allocations should be proportional to those for a full-credit course.

Course Outline

Section A: Spatial Information

Spatial information in graphic forms is readily available in Canadian society. For example, newspapers, magazines, and television news programs rely on maps to illustrate patterns, locations, and events. Similarly, writers, governments, and businesses use charts, graphs, photos, and diagrams for purposes such as making comparisons, showing trends, or portraying interactions. Because the design and preparation of illustrations require time, effort, and expense, such illustrations should meet needs that cannot be met as effectively in other ways.

The first purpose of this section is to raise student awareness of the variety and usefulness of the spatial information available to individuals, governments, and businesses. The second is to consider the usefulness of graphic forms of communication in supporting other ways of presenting information.

The unit is intended to be exploratory and to raise questions about the need for and uses of graphic forms of communication. Students should be encouraged to find examples of graphic materials and assess the purpose and value of the information they contain.

Students could begin by examining examples of spatial information available within the community. They should then examine presentations (e.g., articles, textbook materials, reports) that are accompanied by information in graphic form (e.g., photographs, maps, charts, graphs, diagrams). They should evaluate the quality of the graphic material and judge its effectiveness for its intended purpose. In their analysis they should consider questions such as the following:

– What information does the graphic material provide?

– Where did the information come from?

– Who gathered and compiled the information?

– Who uses the information and for what purposes?

– What were alternative ways in which the information might have been presented?

– How effective was the presentation of the information?

From 5 to 10 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to:

– discuss the need of governments and non-government agencies for information;

– evaluate the right of individuals to access information held by governments and non-government agencies.

Knowledge objectives. Students shall be provided with opportunities to:

B G A identify and describe examples of spatially significant information gathered in the local community and region;

B G A identify examples of information systems and information technology used in the community;

B G A describe uses made of graphic materials by individuals, organizations, and governments within the community and region.

Section B: From Reality to Abstraction

Skills objectives. Students shall be provided with opportunities to:

B G A evaluate examples of graphic forms of communication available within the school, community, or region that provide spatially significant information. Examples could include the following:

a) maps (e.g., zoning, tourist, land-use capability, soil, vegetation, drainage), subdivision plans, and street directories;
b) photographs, maps, charts, graphs, models, or diagrams used in support of written or other material in textbooks, articles, reports, plans, and proposals.

The presentation of spatial information inevitably poses problems for the presenter. Because reality is complex, it is necessary to be selective about what information will be useful and to simplify its organization and arrangement so that the most important features become clear. In this section students gather and present information so that others can get an accurate image of some part of the earth that they do not already know.

Depending on their prior experience, students may need practice in the following:

- sensing their own environment
- recording information about the environment
- summarizing and organizing the information
- identifying a goal for the presentation of the information
- choosing appropriate forms for presenting the information
- designing the presentation
- drafting the presentation

On the basis of this experience, students should identify and evaluate other sources of information on spatially significant phenomena, such as counts, photographs, films, surveys, census data, and remotely sensed images. They should reach some generalizations about the problems associated with handling information, the types of decisions that must be made in organizing and presenting information, and some of the conventions used by graphic designers, with a particular emphasis on map making.

Students should meet the objectives of this unit largely through project work. As they attempt to design and produce graphic forms of communication, students should, individually or co-operatively, solve the problems that this entails. Teachers should act primarily as organizers and consultants, monitoring the planning and progress of each project.

Because all students will be involved in solving the problems associated with graphic design, this section of the course provides ideal opportunities for group work and for self- and peer-evaluation activities. Projects should be evaluated for qualities such as accuracy, clarity, choice of scale, use of symbols and text, appearance, and use of data, as well as students' success in meeting the objectives of the unit.

Research and experience indicate that students require a good deal of practice in a number of situations to make the association between three dimensions and most graphic presentations, which are two-dimensional. Students should get sufficient practice in activities such as pacing, observing, estimating, measuring, describing, sketching, and working with models to enable them to become comfortable with the transition.

From 10 to 20 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to:

– evaluate the right of individuals and businesses to keep their information private;

– assess the importance of objectivity in working with information.

Knowledge objectives. As appropriate for the projects undertaken, students shall be provided with opportunities to:

		A	investigate the characteristics of frequently used map projections;
B	G	A	review the nature and uses of grid and co-ordinate systems;
B	G	A	relate choice of scales to the amount of information being presented;
B	G	A	learn basic principles of symbolization, text styles, and print size;
	G	A	explain the advantages and disadvantages of a variety of forms of graphic presentation;
B	G	A	describe the purposes of keys and legends;
B	G	A	become familiar with simple map-making tools, materials, and reproduction techniques;
B	G	A	identify problems associated with obtaining and processing data for graphic presentation;
B	G	A	learn the basics of interpreting aerial photographs and remotely sensed images;
B	G	A	understand the concepts of sampling size, random choice, stratification, and bias;
B	G		understand the process of ranking and its uses;
B	G	A	learn simple statistical-analysis tools (e.g., per cent, density, yield, per capita, mean) and their use in presenting spatially significant information;
B	G	A	understand the concept of correlation to find the degree of association between two sets of paired values;
	G	A	know how to include and exclude bias in surveys.

Skills objectives. Students shall be provided with opportunities to:

B G A	practise the skills of observing, detecting, discriminating, measuring, and classifying, basing their work on information from their own environment;
B G A	practise the skills of selecting, counting, gathering, interviewing, surveying, sketching, plotting, tabulating, and compiling, basing their work on information from their own environment;
B G A	classify and evaluate information for accuracy, currency, and bias;
B G A	choose appropriate forms of presentation to show the location, area, flow, volume, orientation, and distribution of selected phenomena in their own environment;
B G A	design a presentation, considering the following as appropriate: focus, scale, layout, compilation, symbolization, text, title, legend;
B G A	use computer technology to draft a presentation;
G A	pose questions or identify issues that can be raised on the basis of the information presented.

Projects

The following are suggestions for projects for which students can collect, organize, and present information in graphic forms. Teachers may add others to the list. Student choices should be governed by their prior experience, the equipment available, and the level of difficulty of the course. Students should undertake and complete a minimum of two projects, including one from each of groups A and B. Care should be taken that, in the gathering of information, students do not infringe on the rights or privacy of others.

Group A projects. On the basis of personally gathered information, students shall produce one or more simple maps, cartograms, charts, graphs, diagrams, or models to:

B G	show land use and describe the operation of a farm;
B G A	show land use along a section of a local highway;
B G	illustrate a tourist brochure;
B G	show traffic or pedestrian flow at a corner or into a mall;
B G A	describe land use in a defined area;
B G	delimit school-attendance areas;
G A	compare time and distance for different forms of transportation;
B G	illustrate patterns of family travel in a week;
G A	produce a sketch of a section of landscape;
B G	illustrate the processes in a local factory;
B G	show the travel distances of some students;
G A	compare the travel distances of students and other family members.

Group B projects. On the basis of data available from other sources, students shall produce one or more simple maps, sketches, cartograms, charts, graphs, diagrams, or models. The sources may be in one of the following forms:

- photographs (horizontal, vertical, or oblique aerial)
- census, assessment, enrolment, production, or distribution data
- remotely sensed images

Section C: From Abstraction to Reality

Just as the presentation of information poses problems for the presenter, the interpretation of information in graphic form inevitably poses problems for the interpreter. Graphic forms such as maps, charts, graphs, diagrams, and models are the result of processes such as selection, aggregation, simplification, and abstraction. To comprehend accurately the reality that they attempt to portray, the interpreter must be able to decode the symbols and create an accurate mental image of his or her own.

In this section students develop and practise skills in interpreting the graphic forms used to present geographic information. Depending on their background and experience, students will need practice in the following:

- reading or decoding the information presented, such as the content or theme (e.g., physical, social, political, cultural, economic) and the conventions used (e.g., form, scale, symbolization, print size, colour)
- analysing the information by identifying, as applicable, sources, figure, ground, features, patterns, associations, accuracy, clarity, bias, quantitative and qualitative data
- interpreting the information by applying skills such as judging the significance of information, identifying trends, observing relationships, and hypothesizing about causes of patterns and associations among the natural and human phenomena presented

As an assignment in this section, students should undertake at least one topographic map study. The map chosen should be at a scale of 1:50 000 or larger. Students should follow a systematic procedure and illustrate their interpretation with simple sketches and diagrams.

From 10 to 20 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to:

- discuss such misuses of information as breach of copyright, plagiarism, or distortion of information by using it out of context;
- identify and evaluate examples of bias in the presentation of information.

Knowledge objectives. Through the study of examples, students shall be provided with opportunities to:

describe the purposes and characteristics of graphic forms such as:

B G A a) sketches and field notes;
B G A b) line, bar, and circle graphs;
B G c) simple diagrams;
B G d) flow charts;
B G A e) cartograms;
B G A f) thematic maps (physical, political, economic);
G A g) topographic maps;

B G A recognize the conventions observed in maps, graphs, and diagrams, such as title, scale, and key;

B G A identify and describe techniques used to show such information as shape, location, distance, amount/volume/quantity, change, flow, distribution, relationship, and interaction;

G A interpret a topographic map at a scale of 1:50 000 or greater, including an explanation of the processes accounting for the current physical and human elements of the landscape;

G A describe the procedures used to compile the topographic map series produced by the Canadian government;

B G A examine the nature and purpose of the Ontario base maps compiled by the Ontario Ministry of Natural Resources.

Skills objectives. Through the use of specific examples, students shall be provided with opportunities to:

B G locate places, using a referencing system;

B G A estimate distances, quantities, and volumes on the basis of the scale of the graphic form used;

B G A identify features on maps, using clues such as shape, size, pattern, colour, and texture;

B G A identify features on aerial photographs and satellite images, using clues such as shape, pattern, colour, and texture;

B G A identify features on aerial photographs and satellite images, using clues such as associations of physical and cultural features;

G A classify maps according to qualities such as equality of area, correctness of shape, and true direction;

B G A analyse maps, graphs, and diagrams to identify features, bias, trends, patterns, associations, and quantitative and qualitative data and to evaluate their accuracy and clarity;

G A prepare overlays, cross sections, and profiles, combining data from two or more sources to show correlations;

G A propose and test hypotheses that explain patterns or trends revealed in graphic forms.

Section D: Locations and Distributions

Spatial information has many uses. As population growth puts increasing demands on the earth's space and resources, the ability to use spatial information will become increasingly important for planning and decision making. In this section of the course, students identify sources of, and describe uses for, information on the locations, distributions, and interactions of natural and human phenomena at a number of scales.

Students should undertake projects at two of three scales: local, national (or continental), and international. In their planning, teachers should refer to the cognitive-skills model in Appendix 2 of Part B of the guideline. Each project should begin with a map or image that shows location or distribution and continue with steps such as the following:

- describing the processes by which the data were gathered
- describing the location or distribution pattern in absolute terms and in relation to natural and human factors that may help to account for it
- hypothesizing about the combination of factors that might account for the location or distribution pattern
- developing an inquiry to gather information that would help to support or refute the hypothesis
- using graphic techniques such as map overlays, profiles, transects, graphs, and diagrams to record and present information that will support or refute the hypothesis
- evaluating the information for its capability to support or refute the hypothesis
- communicating the findings of the inquiry in an appropriate way

Spatial information has value. Students should discuss and reach conclusions about the usefulness of the information they have compiled and the conclusions they have reached. There is a large and growing volume of material in the form of maps, satellite images, and data bases (available from local, provincial, national, and international sources) from which students can identify contemporary patterns of location and distribution for investigation.

From 25 to 40 per cent of the time available for the course should be allotted to this section.

Attitudinal objectives. Students shall be provided with opportunities to appreciate the influence of economic, cultural, and social values in determining the use of the land.

Knowledge objectives. Students shall be provided with opportunities to:

B G A	describe current technologies used to gather, process, store, retrieve, and display spatial information at local, provincial, national, and international scales;
G A	describe the nature and uses of land-related information systems or geographic information systems;
B G A	identify and describe factors that give significance to locations for specific purposes;
B G A	describe and account for two patterns of natural or human phenomena;
G A	identify questions, issues, or problems for which spatial information is useful;
B G A	develop one or more inquiries into issues concerning locations, distributions, and interactions.

Skills objectives. Students shall be provided with opportunities to:

B G A	develop a focus and an organizer to inquire into the location or distribution of two or more natural or human feature of the landscape, as identified in the lists on this page;
B G A	obtain information by such means as personally designed surveys, counts, questionnaires, and field studies or locate data available from municipal, national, or international sources to develop a map of the location or distribution of the features;
B G A	assess the accuracy and reliability of the data obtained;
G A	evaluate the appropriateness of the data for the purpose of the inquiry;
B G A	create a map, cartogram, graph, or diagram to present the data in graphic form;
B G A	pose and test hypotheses to explain the locations or distributions of the features;
G A	apply the hypotheses to locations or distributions of similar features;
G A	draw conclusions based on the inquiry and communicate the conclusions in the most appropriate way;
A	select the most appropriate map scale and projection for a specific purpose.

Suggested Locations and Distributions for Investigation

Using graphic forms and text, students should explain the location or distribution of a minimum of two natural or human features of the landscape, such as those suggested below.

	Local or Regional Scale
B G	fast-food franchises
B G	bank branches
B G A	auto-rental agencies
B G A	hotels
B G A	hospitals
B G	service stations
G A	furniture stores
G A	recreation centres
A	mineral deposits
B G A	crops or orchards
A	distribution or collection systems
G A	geomorphological features
G A	harbour developments
G A	wildlife habitats
G A	microwave towers, transmission corridors

	National (or Continental) Scale
G A	head offices of companies
B G A	auto-assembly plants
B G A	oil refineries
B G A	military bases
G A	national parks
B G A	major sports franchises
B G A	pulp mills
G A	film or television studios
G A	major crops
A	publishing houses
A	transportation or communications networks
B G A	wildlife habitats

	International Scale
A	stock exchanges
B G A	satellite tracking stations
A	economic or military alliances
G A	international air terminals
B G A	per capita incomes
B G	crops
G A	commodity flows
B G A	diseases
G A	expenditures by nations on arms, education, roads, and public health

Section E: Applications of Geographic Techniques

This unit requires students to select for analysis one or more issues or situations that may be better understood and acted on when investigated from a geographic perspective. The topic or topics chosen may have local, regional, national, or international significance. While the investigation may initially be focused on an environmental, economic, political, or social issue, students will discover that most issues involve all of these dimensions to a greater or lesser degree. From 25 to 40 per cent of the time available for the course should be allotted to this section.

To develop their topics, students will follow a procedure such as the following:

– describe the issue or situation clearly

– create an organizer to address the issue

– identify the types and sources of information to analyse the situation

– research to locate the information necessary

– develop graphic forms that will clarify the issues for themselves and others

– identify concepts and principles on which decisions could be based or action taken

– develop and evaluate alternative courses of action that might be taken

– prepare and defend a proposal for action

– prepare (if feasible) a staged plan to promote or implement the proposal

Maximum learning is likely to take place if students undertake such projects in groups, so that a variety of viewpoints are brought to the study and the work to locate and compile information is shared among a number of persons.

Attitudinal objectives. Students shall be provided with opportunities to:

– identify the social, political, economic, cultural, environmental, or humanitarian dimensions of the specific topics chosen for study;

– discuss the social, political, economic, cultural, environmental, or humanitarian principles that should be applied in the issue or situation selected for study.

Knowledge objectives. Students shall be provided with opportunities to:

B G A identify issues or situations that involve interaction between people and the environment, interaction between two or more areas on the earth's surface, or the development of a region;

B G A design and follow a procedure for the investigation of the situation or issue selected for study;

B G A determine the advantages and disadvantages of maps, charts, diagrams, and models in showing complex relationships and interactions.

Skills objectives. Students shall be provided with opportunities to:

B G A develop and defend a proposal to take action to resolve an issue of local, national, or international significance involving the use of land or resources;

B G A role-play the viewpoints of individuals or groups involved in the issue or situation under study.

Suggested Topics

Good topics for student investigation will often be based on current issues or situations at the local, national, or international level because data and opinions on them may be readily available. Students should locate and present in graphic form information that would help to accomplish projects such as the following:

Local Topics

B G A the planning of an orienteering, a bicycle, or an auto-rally route; a recreation area, hiking trail, campground, or landfill site; a daycare centre, sport or cultural centre, or shopping mall; affordable housing; a hospital, senior citizens' residence, or group home

G A the planning of a dam site, sewage-treatment plant, new secondary school, or transportation terminal

B G A the reduction in staff levels or the closing of a local industry

G A the potential of the local area as a site for a new industry

B G the preservation of a unique habitat or heritage building

B G the purchase of a home, summer cottage, or time-share vacation condominium

B the relocation of a public-works facility

G A the relocation of electoral boundaries, a transportation route, an industrial subdivision, or a commercial core area

(All local studies should include an analysis of detailed maps at a scale of 1:50 000 or greater.)

Regional or National Topics

B G A the planning of a provincial park, hiking trail, or conference centre

G A the planning of a national park, disposal site for nuclear waste, new satellite town, or major aircraft or railway repair depot

G A the preservation of a wilderness area or unique ecosystem

B G A the provision of a regional service such as a museum, a library, or a fire, a police, or an ambulance network

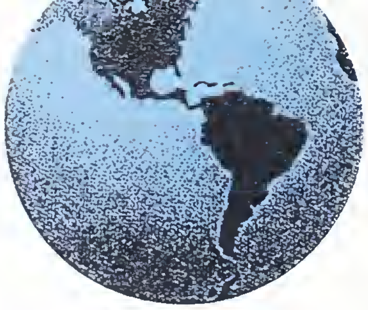
B G A the awarding of a television, radio, or sports franchise or of a government administrative office to a community

B G A the location of an elite sports training facility, an elite cultural facility, or a correctional institution

International Topics

B G A	the establishment of a world heritage area
G A	the development of a trade agreement between two or more nations
G A	the introduction of a disease-control program in a developing nation
B G A	the preservation of a vanishing species
A	the illustration of the operations of a multinational company
A	the location of a headquarters for a worldwide financial institution (e.g., a credit-card company)
B G A	the illustration of the flow of a major world commodity (e.g., oil, coal, wheat, coffee, textiles, armaments)
G A	the definition of a national border or the settling of a boundary dispute
G A	the evaluation of proposals for the independence of a minority group or the merger of two or more independent political units
A	the assessment of the effects of a rise in sea or lake levels

GEOLOGY (GGE or SGE)*



These courses provide students with an introduction to the study of geology. The emphasis is placed on the dynamic nature of the planet Earth through a study of the physical, chemical, and geological nature of its parts and their relationship in time and space. Studies should relate, wherever possible, to the students' local environment.

The course outlines for geology are contained in *Part 11: Geology, Grade 12, General and Advanced Levels* of *Science, Intermediate and Senior Divisions, 1988*. Geology courses should be taught in conjunction with the appropriate policy components found in both the science guideline (*Part 1: Program Outline and Policy*) and this geography guideline (*Part A: Policy and Program Expectations* and *Part B: Planning at the Local Level*).

These courses may form part of a school's geography or science program, and the credit earned in geology may, at the individual student's discretion, be used as a credit in either geography or science. Whether classified as geography or science, the advanced-level course may be used as a prerequisite to the Science in Society OAC. In addition, if a geology course is credited to geography, it may be counted as the compulsory social-science credit required in the Senior Division.

For transcript purposes, science teachers will be coding the geology courses as Grade 12 courses only. However, the courses may be taught in other appropriate grades as desired. Geography teachers should code their courses to reflect the grade level at which they are offered.

---

[*] The course code to be used for these courses depends on whether the course in question is designated as a geography (GGE) or as a science (SGE) course.

E

GEOGRAPHY

ISBN 0-7729-4246-3

© Queen's Printer for Ontario, 1988